Small Business Innovation Research/Small Business Tech Transfer

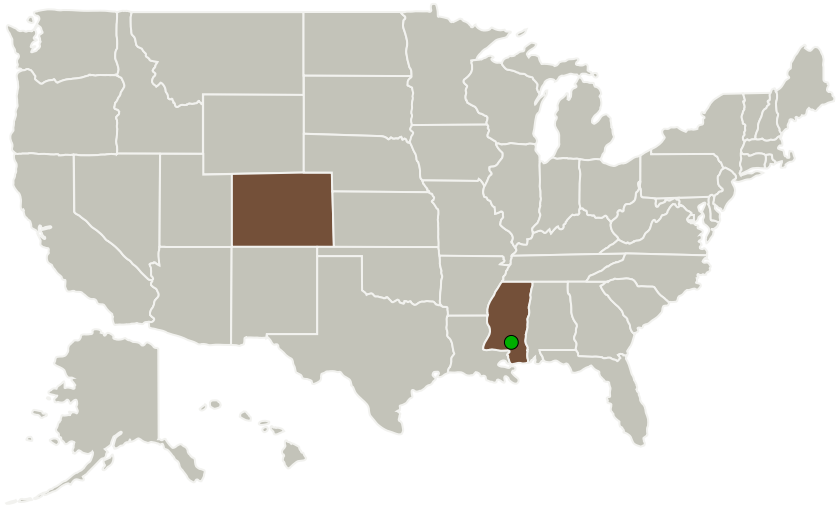
H2/He Separation System, Phase I

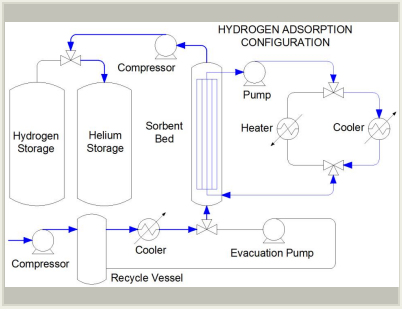
Completed Technology Project (2017 - 2017)

Project Introduction

NASA uses an estimated 75 million standard cubic feet of helium (approximately $5M worth) each year for safely purging hydrogen systems before filling and after discharging, and while leak checking, pressurizing lines and blanketing liquid hydrogen storage tanks. Despite its expense, there is no substitute for helium in most of these applications because of its extremely low boiling point and unique chemical inertness. The price of helium is expected to increase as reserves are drawn down. In addition to helium, the high supply costs and limited availability of hydrogen fuel also requires its conservation. While it is not as expensive as helium and is more abundant, the transport of hydrogen is still costly and poses a great environmental risk due its flammability and highly reactive nature. Therefore, an efficient way to separate the He/H2 from NASA's purge streams and recover both the helium and hydrogen in a pure form is critical to reduce cost of operations and to reduce risks. In Phase I we will synthesize and optimize a new sorbent and develop a process and cycle scheme that will allow us to achieve the target helium and hydrogen purities with low energy consumption.

Primary U.S. Work Locations and Key Partners





H2/He Separation System, Phase I Briefing Chart Image

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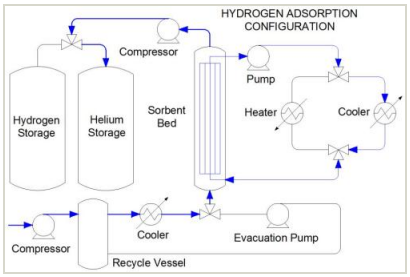
Organizations Performing Work	Role	Type	Location
TDA Research, Inc.	Lead Organization	Industry	Wheat Ridge, Colorado
Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi

Primary U.S. Work Locations	
Colorado	Mississippi

Images



Briefing Chart Image
H2/He Separation System, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/131381)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
TDA Research, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

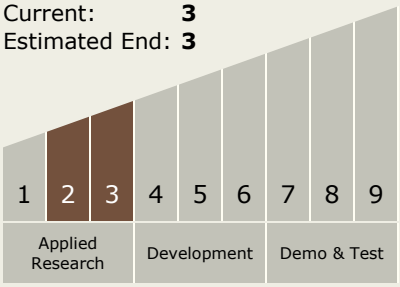
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Gokhan Alptekin

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



H2/He Separation System, Phase I

Completed Technology Project (2017 - 2017)

Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
  - TX13.1 Infrastructure Optimization
    - TX13.1.3 Commodity Recovery

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System